THE LIFE HISTORY OF GUARAX ARENE COQ. (DIPTERA-CHLOROPIDÆ), AN EGG PREDATOR OF THE BLACK WIDOW SPIDER, LATRODECTUS MACTANS (FABR.)

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Gaurax araneæ is a dipterous predator of the eggs of the black widow spider, *Latrodectus mactans.* It is a common species in the San Francisco Bay region, and at Mill Valley some 40% of an extensive series of black widow egg sacs collected by the authors were found infested thereby. It does not appear to be solely a predator of *Latrodectus*, however. Essig (1926) states that it was reared from the egg sac of another spider, *Argiope riparia* Hentz many years ago. Its significance was not recognized at that time, however, as it was regarded as a scavenger. Its true predatory nature was first pointed out by Herms *et al* (1935) when it was found destroying the eggs of *Latrodectus* in several parts of California. No reports on the life history of this predator appear to have been published heretofore, with the exception of a recent, ably illustrated popular account by Jenks (1936). His report disagrees, however, on several important points with the results herein recorded.

The first adults used in the present study were reared from pupæ collected in the field. The breeding cages were kept in the laboratory where the temperature averaged 68° F. It was found necessary to feed the flies in order to get them to oviposit. This was done by placing a piece of banana or other fruit in the cage. Properly nourished flies oviposit readily on the surface of the spider's egg sac at any point. Each female lays from 15 to 25 eggs which measure approximately .5 mm. by .12 mm. The chorion is glistening white and deeply ridged longitudinally. The incubation period is six days. The newly emerged larvæ average .6 mm. in length.

Almost at once, following eclosion, the larvæ exhibit a tendency to migrate toward the suspending end of the egg sac, the path taken, however, being very erratic. At intervals along the way the larvæ pause and attempt to penetrate the fabric of the egg sac. Such attempts appear never to be successful, although a larva may spend several minutes standing on end trying to

force an opening with its mouthparts. Normally, entrance into the egg sac seems to be accomplished only by passing through the loosely woven primary layer of silk where it is left incompletely covered by the secondary tough protective coat at the suspending end. The larvæ perish on the surface if they do not succeed in making their way into the cavity of the sac within a few hours after hatching.

After gaining an entrance, the young larvæ begin feeding on the spider eggs. The larval period is eight days, pupation invariably occurring on the fourteenth day after the eggs are laid. The full grown larvæ vary in length from 3 mm. to 4 mm., depending upon their number and the number of spider eggs originally present in the egg case. (In one instance a number of flies were allowed to oviposit on the same egg sac and together they deposited about 400 ova. The number of spider eggs in the sac proved insufficient to supply nourishment for so many predators, for, after destroying all the eggs, the larvæ died without reaching maturity.)

When ready to pupate, the *Gaurax* larvæ pull apart the inner loosely woven fabric of the spider's egg sac, separating it from the tough outer covering so that the former comes to form a loose mass in the interior of the sac. The larvæ then tear away, at scattered points, the inner portion of the tough fabric so that it becomes extremely thin in these spots. Pupation occurs any place within the cavity, either next to the outer wall or suspended among the tangled strands of the inner sac. The pupæ measure some 3 mm. in length.

The pupal period lasts fourteen days. The emerged flies escape from the spider's egg case by forcing their way through one or more of the thinned regions prepared in the silken fabric by the larvæ.

Ordinarily, a black widow egg sac harbors only one brood of these predators. However, one sac was taken in the field which produced two broods of *Gaurax* with several days difference in their ages. Both broods were small, and it is probable that they were derived from eggs deposited by two females at different times.

Because of the relatively high incidence of infestation observed during this study of *Gaurax* on *Latrodectus*, it is evident that this fly is an important factor in reducing the number of

black widow spiders in the field. No infested egg sacs were taken from enclosed environments such as from under houses or in garages or outhouses. *Gaurax* therefore appears to be insignificant in the control of *Latrodectus* in human habitations where the latter is a particular menace to humans.

Literature Cited

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NOTE ON ARGYNNIS SKINNERI HOLLAND

(Lepidoptera-Nymphalidæ)

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In the revised edition of the Butterfly Book (p. 95) Dr. W. J. Holland (1931) makes the following statement: "The specific name *sakuntala* is dangerously near to *Argynnis sakontala* Kollar, which designates a race of *A. childreni* from the Himalayas. It would appear to be desirable to change the specific name, and in that case it would be most appropriate to name the form *A. skinneri* in honor of the first describer." In this statement and his use of *sakuntala* in other parts of his work, it seems to be obvious, though I may be in error, that Dr. Holland is not intending to rename *sakuntala* Skinner (1911) but is merely stating that it ought to be so named in case it is found necessary. However, in such cases we cannot quibble about what he meant or did not mean and must regard the name as being proposed, as has been done in the Zoological Record. *Skinneri* is not needed as *sakuntala* Skinner (1911) and *sakontala* Kollar (1844) are not from the same root and the former, therefore, is not a homonym. As a matter of form: *Arg. skinneri* Holland = *Arg. sakuntala* Skinner.